

Participating in Science & Engineering Fairs - A Practical Approach



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**When Somebody
Says “Science
Fair” What’s
The First
Thought That
Pops Into Your
Head??**



A Science Fair Is...



If You're A Teacher:

- **A Tool**
- **Something To Grade On**
- **A Creative Outlet for Students**

If You're A Parent:

- **Stressful...it's a PAIN!!**
- **Conflicts...Helplessness**
- **Potential Source of Pride**

If You're A Student

- **A Requirement For A Grade**
- **More Work!!**
- **Too Many Decisions!!!**
- **Fear Of Unknown**

What SHOULD You Think Of?



How You Will Feel After Participating In The Science Fair

- Pride...Not Relief!
- Rewarded...Not Punished
- Reward is an Honorable Goal!!
- Motivator Doesn't Always Have To Be Grades!



***If It Motivates You...
Work for the
Rewards!!!***

***The Important
Results Will Be***

A Science Fair Project Is An Opportunity!!

Lots of Awards!

- **Prizes**
- **Money**
- **Scholarships**
- **Summer Jobs**
- **Entry Into Select Colleges**

By Products:

- **Organization Skills**
- **Critical Thinking Skills**
- **Presentation Skills**
- **Sense of Self**



The Recipe - Classic Science Fair “Steps”



QUESTION

RESEARC

HYPOTHESIS

PROCEDURE

EXPERIMENT

RESULTS

ANALYSIS

CONCLUSION

Scientific Method

Question - Developing the Best Question For You



Consider Your

- Interests
- Knowledge Base
- Access to Mentors
- Available Equipment
- Natural Surroundings

Make A List of Each

- Look For Matches Between Rows



STEP #1 - QUESTION

Question - Developing the Best Question For You



INTERESTS	KNOWLEDGE/ SKILLS	MENTOR	EQUIPMENT/ SURROUNDIN G
BASKETBALL	MATH	MARY - CHEMISTRY	RULERS
COMPUTER	COMPUTER GAMES	JIM - GARDENING	SCALES (BATH, FOOD, POSTAL)
BUILDING	DRIBBLING BASKETBALL	BOB - ELECTRONICS	THERMOMETERS
LEGOS	BUILDING THINGS	JANE - MECH ENG	FISH TANK
SWIMMING		BETTY - NURSE	BLOOD PRESSURE MONITOR
BIKING		ROY - PAINTER	STOP WATCH
MEDICINE			AUDIO RECORDER
			LEVEL
			RUBBER BANDS
			PRESSURE GAUGES

STEP #1 - QUESTION

Question - Developing the **Best Question For** **Websites To Spark Ideas**

- <http://www.stemnet.nf.ca/sciencefairs/>
- <http://www.scifair.org/ideas/index.shtml>
- <http://members.aol.com/ScienzFair/electric.htm>
- <http://halcyon.com/sciclub/cgi-pvt/scifair/guestbook.html>
- http://madsci.org/MS_search.html
- <http://youth.net/nsrc/sci/sci.index.html>
- <http://jpl.org/div/kidspace/projectguide/projects.html>
- <http://amasci.com/amateur/sciam1.html>
- <http://scitoys.com/>
- <http://www.all-science-fair-projects.com>



STEP #1 - QUESTION

Research - Get A Notebook!



- **Make A Commitment To Document Your Work**
- **Research Underlying Scientific Principles:**
 - **To Help Make Educated Guess To Answer Your Question**
 - **To Define the Test Design**
- **Internet Searches Are Great... But Don't Forget Books and People!!**



Hypothesis

- **The Hypothesis Rewords Your Question In A Way To Help You Do Your Test**
 - **Predict the Answer, State Your Reason, If Possible**
 - **Select Projects With Well Formed Hypothesis**
- **Special Cases - Engineering Projects**
 - **Recommendation: Always Have Hypothesis Listed On Poster Board, Regardless of Its Quality**

**STEP #3 -
HYPOTHESIS**

Procedure/Experiment - Design Is Critical



- Experiments Should Result in Data That Can Be Displayed in a Graph
 - Imagine the Ideal Graph(s) That Will Answer Your Question
 - Remember That You Will Need To Record The Data...How Will That Data Arrive?
 - How Long Will Data Point Stay Valid?
 - What Measurement Tools Do You Need?
 - Video Camcorders Can Help Slow Time

**STEP #4 & 5 - PROCEDURE &
EXPERIMENT**

Results - Perform The Experiment



- **The Better You Plan, The Simpler The Test!**
- **Record All Testing - Even Failures**
 - **Record All Conditions**
 - **Record Qualitative Data Like Noises/Smells**
 - **Record Measuring Tool And Units Of Data**
 - **Label Each Data Run By Time Of Day**
 - **Take Pictures Of Test Setup, If Possible**



STEP #6 - RESULTS

Analysis - Have No Fear!!



- You Analyze The Data By Putting It in the Graph**
 - Ask Questions of the Graph**
 - Report any Interesting Answers**
 - Indicate Reproducibility of Data - Show Multiple Runs on Graphs...or Use Statistics**
 - Use Different Graphs to Show Different Features**
 - Spreadsheets Are Powerful Tools**

Conclusion



- Your Conclusion is a Summary Focused On Answering Your Question/Hypothesis
 - If Your Hypothesis Was Incorrect or Disproved, It is NOT a Failed Experiment!
 - If Your Hypothesis Was Disproved, Offer An Alternative Explanation
 - Always Consider What More Could Be Done
 - Another Test
 - Another Project

Checklist - What To Ask Yourself and/or Your Mentor



- Has Something Like This Done Before?**
 - Is There A “Twist” I Can Take?**

- Do I Know The Answer To My Experiment Before I Test It?**
 - Is It Too Obvious?**
 - Is There A More Interesting Question?**

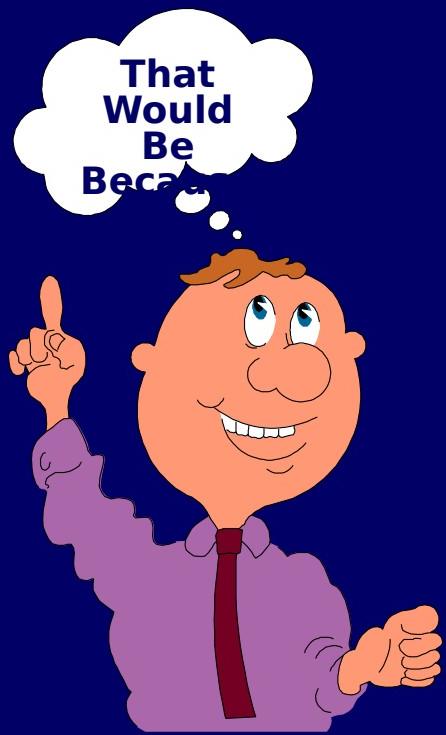
- What Do I Put In My Log Book?**
 - Everything!! Use Like A Diary!!**

Checklist - What To Ask Yourself and/or Your Mentor



- How Do I Analyze?**
 - Use A Graph
 - Use Statistics
- How Much Data Should I Take?**
 - One Run Is Not Enough!
 - Do At Least Three (3)
- How Do I Define My Experiment?**
 - Start With Your Question
 - Envision Graphs That Answer Your Question

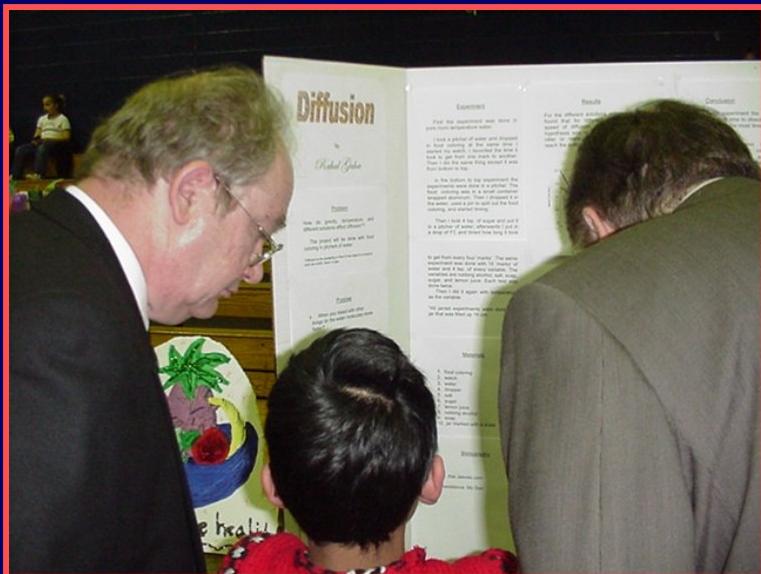
Prepare For Presentation:



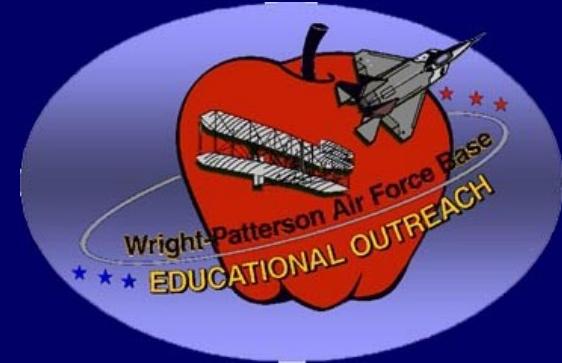
- **The Focus Should Be Knowledge ... But In A Science Fair
IMPRESS THE JUDGES!!**
 - **Anticipate Questions The Judge Will Ask**
 - **Research The Answer**
 - **Make Yourself A Note Card**
 - **Practice Reciting The Answer So It Sounds Natural**

Preparing For The Judges:

- Expect Questions
- Have Your Answer Ready
- Work Info Into Your



- ## Typical Questions
- Where Did The Idea For This Project Come From?
 - What Did You Learn From Your Research?
 - What Were The Important Sources Used In Your Research?



Preparing For The Judges - Typical Questions:



- I Where did the idea for this project come from?**
- I What did you learn from your research?**
- I What were the most important sources used in your research?**
- I How much time did you spend on the project?**
What took most of your time?
- I Where did items used in your project come from?**
- I How many times did you run the experiment on each configuration?**
- I Did you use any statistics such as averaging?**
- I How constant were your conditions during experiments?**
- I What would you do differently? What more would you like to do?**

Selling Yourself - Use PIE!



- **Performance**
- **Image**
- **Exposure**



- **Science Fairs Are A GREAT Time To Learn How To Promote Yourself**
- **Many Successful People Use PIE Principle**
- **“Performance” Already Covered**
- **Look At Image And Exposure...**

Image -

The Impression You Give in Appearance and

Actions:

- You Want The Judges To Relate To You And See Their History In YOUR Future!**
 - Project The Image Of Being A Budding Scientist Or Engineer**
 - Dress Like They Would Dress**
 - Show Them You Enjoy What You're Doing...tell Stories, Ask Questions**
 - Play To Their Expertise...How Could I Do This Better For The Next Fair?**



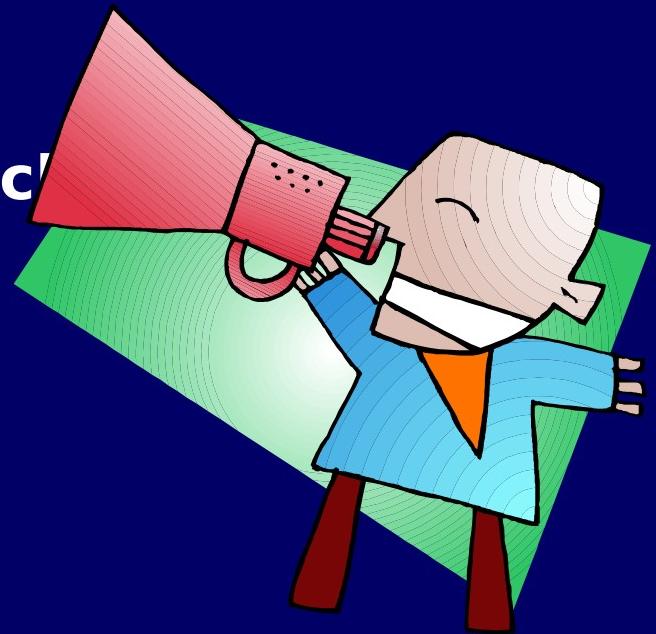
Exposure -

**Make Sure The
Judges See You and
Remember You;**

- **Use Attention Grabbing Displays
and posters**
- **Check the Rules!!!**

- **For Maximum “Traffic”,
A Project That Related To
Today’s Public Concerns**

- **Global Warming**
- **Pollution**
- **Water Purification**
- **Security Devices**
- **Genetically Altered Food,
Etc.**



Motivation - Many Opportunities Await!



- That Future Exceptional Science and/or Engineering Student Can Be You!!
- Summer Jobs, Free Training, Camps and More Are Available Through Science Fairs!
- Places To Check:
 - Ohio Academy of Science
<http://www.ohiosci.org/>
 - International Science and Engineering Fair... Make Participation in this Fair Your Goal! <http://www.sciserv.org/isef/>

Motivation - Many Opportunities Await!



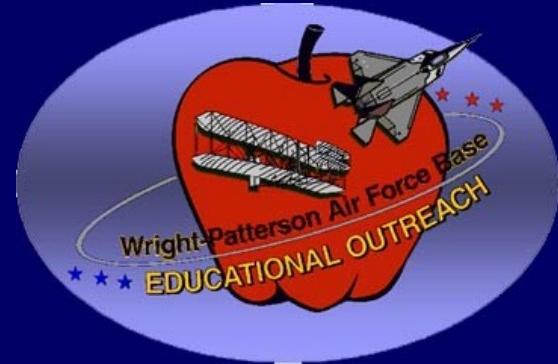
More Places To Check Out:

- **Junior Science and Humanities Symposium**
<http://www.biosciences.utoledo.edu/oishs/index.htm>
- **Science Talent Search**
<http://www.intel.com/education/sts/>
- **National Youth Science Camp**
<http://www.sciencecamp.org/>
- **National Gallery for America's Young Inventors**
<http://www.pafinc.com/gallery/index.htm>

IT REALLY WORKS!!!!

Did We Mention “Having Fun”? :

- People Throughout History Experimented with Science and Engineering “For Fun”
- Imagine Getting Paid For Doing Something You Enjoy Doing!!
- To Avoid Stress:
 - Start Your Project Early, Be Ready... then Kick Back and Enjoy!!



I HOPE TO SEE YOU
ELSENCE AND ENOUGH LEARNING LEARN



For Additional Information



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